

PATENT ABSTRACTS OF JAPAN

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#### (54) CAMERA SYSTEM

##### (57)Abstract:

PROBLEM TO BE SOLVED: To allow a user to easily locate a fault on a monitor by simultaneously displaying the entire image of monitored area and a magnified image including the fault in the monitored area onto the monitor in a camera system where a supervisory camera photographs the monitored area and a state of the supervised place is monitored on the monitor.

SOLUTION: A fault occurrence part caused by intrusion of a suspicious looking person or the like is extracted from a current image from a difference between the current image of a supervised place photographed sequentially by a supervisory camera 10 and a background image of the supervised place recorded in advance in an image memory 14 before the occurrence of a fault, and an image magnification processing section 22 magnifies image data of the fault occurrence part. Then a current image (entire image of supervised place) of the supervisory camera 10 and the magnified image of the fault occurrence part are entered to a display section 26 and the images are displayed simultaneously

on the monitor of the display section 26.

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## CLAIMS

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[Claim(s)]

[Claim 1] In the camera system in which a photography location is photoed with a camera, the this photoed image is displayed on a monitor and change of a photography location is shown on this monitor The background image memorized by an image storage means to memorize the background image before change generating of said photography location, and the present image serially photoed with said camera and said image storage means is compared. An image extract means to extract the image of different change generating range from said background image from said present image, The image amplification processing means which carries out amplification processing of the image of the change generating range extracted by said image extract means, the display means which carries out the monitor display of the present image serially photoed with said camera, and the image of the change generating range by which amplification processing was carried out with said image amplification processing means simultaneously -- since -- the camera system

characterized by becoming.

[Claim 2] Said display means is the camera system of claim 1 characterized by what the present image of said photography location and said image of the change generating range by which amplification processing was carried out are divided on one monitor, or is displayed in piles.

[Claim 3] Said image amplification processing means is the camera system of claim 1 characterized by the ability to change into the range of desired the range which said present image expands.

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## DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the surveillance camera system which can be applied to a camera system, especially can grasp a suspicious person etc. easily in a surveillance camera system.

[0002]

[Description of the Prior Art] In the surveillance camera system, when abnormalities are detected on a monitor, the zoom function of a lens is operated

automatically, the part which abnormalities generated is zoomed in, and the system which expands an abnormal occurrence part and is copied out on a monitor is proposed by JP,9-212770,A.

[0003] That is, what the angle of visibility of a surveillance camera is turned to the core of abnormalities when abnormalities are detected by the image by the surveillance camera, the part which abnormalities generated is expanded, and is recorded on VTR etc. is indicated by said JP,9-212770,A.

[0004]

[Problem(s) to be Solved by the Invention] Although the abnormal occurrence part detected automatically can be greatly copied out with a zoom in the surveillance camera system of said JP,9-212770,A, since the whole location to supervise always cannot be copied out, there is a fault which takes time in grasping what part of the location which an abnormal occurrence part supervises it is.

[0005] This invention was made in view of such a situation, and aims at proposing the camera system which an abnormal occurrence part can grasp easily on a monitor.

[0006]

[Means for Solving the Problem] In the camera system in which a photography location is photoed with a camera, the this photoed image is displayed on a

monitor and change of a photography location is shown on this monitor in order that this invention may attain said object The background image memorized by an image storage means to memorize the background image before change generating of said photography location, and the present image serially photoed with said camera and said image storage means is compared. An image extract means to extract the image of different change generating range from said background image from said present image, The image amplification processing means which carries out amplification processing of the image of the change generating range extracted by said image extract means, the display means which carries out the monitor display of the present image serially photoed with said camera, and the image of the change generating range by which amplification processing was carried out with said image amplification processing means simultaneously -- since -- it is characterized by becoming.

[0007] According to this invention, the background image before change generating beforehand remembered to be the present image of the photography location serially photoed with a camera to the image memory etc. is compared, the image of the change generating range is extracted from the present image, and while carrying out amplification processing and carrying out the monitor display of the image of this change generating range, the whole photography location image serially photoed with the above-mentioned camera also carries

out a monitor display simultaneously.

[0008] Since the whole photography location image and the amplification image of a change generating part are simultaneously displayed on a monitor by this, while a change generating part can grasp easily on a monitor, the detail of the change generating part can be grasped easily.

[0009]

[Embodiment of the Invention] The gestalt of desirable operation of the camera system applied to this invention according to an accompanying drawing below is explained in full detail. Drawing 1 is the block diagram showing the gestalt of operation of the surveillance camera system concerning this invention. The surveillance camera system shown in this drawing is equipped with the surveillance camera 10 installed in the position, and the image of a monitoring station is photoed by this surveillance camera 10. The picture signal which the picture signal outputted from the surveillance camera 10 was inputted into A/D converter 12 and the display 26, and was inputted into the display 26 is outputted to a monitor as it is, and the whole monitoring station image is displayed on a monitor.

[0010] On the other hand, the picture signal inputted into A/D converter 12 is changed into a digital signal by this A/D converter 12, and is inputted into an image memory 14 or a subtractor 16. The picture signal inputted into the image



memory 14 here is the image data of the photography image (namely, background image of a monitoring station) of the changeless condition of the lifetime from abnormalities, when abnormalities have not occurred, and a trigger on directs record of image data by switch actuation etc., the image data for one image outputted from above-mentioned A/D converter 12 is inputted into this image memory 14, and a background image is recorded on an image memory 14. In addition, you may make it update the image data of an image memory 14 automatically not for switch actuation but for every predetermined time. On the other hand, when there are no directions of record of the above-mentioned image data at the time of monitor actuation of a surveillance camera system, the image data of the present image serially outputted from above-mentioned A/D converter 12 is inputted into the direct subtractor 16.

[0011] The image data of the present image inputted into the subtractor 16 is subtracted by the image data of the above-mentioned image memory 14 inputted from other input terminals of a subtractor 16. If a different image from a background image is contained in the present image by this when a suspicious person trespasses upon a monitoring station, the image of the abnormal occurrence part will be extracted. When there are no abnormalities in the present image, since the present image is equal to a background image, in all pixels, image data serves as a value near abbreviation 0.

[0012] Thus, the image data which subtracted the background image and was obtained from the present image is inputted into the image difference distinction section 18 next. The image difference distinction section 18 distinguishes the absolute value of each pixel of the inputted image data from those with an image difference, when there are more pixels distinguished and distinguished in the larger pixel (pixel of an abnormal occurrence part) than a threshold than the number of criteria as compared with a predetermined threshold. And the data in which the location of each pixel of the abnormal occurrence part distinguished from those [ the ] with an image difference is shown are inputted into the center-of-gravity calculation section 20.

[0013] The center-of-gravity calculation section 20 will compute the range and center-of-gravity location of the abnormal occurrence part, if the data in which the location of each pixel of an abnormal occurrence part is shown as mentioned above are inputted. Calculation of this range and a center-of-gravity location detects the perpendicular direction and the horizontal endpoint (the upper bed, the soffit, the left end, and right end) of the range of the pixel distinguished from those with an image difference, makes the square passing through each of these endpoints the range of an abnormal occurrence part (henceforth the abnormal occurrence range), computes the center position of this abnormal occurrence range, and makes this location the center-of-gravity location of the abnormal

occurrence range.

[0014] The abnormal occurrence range computed by the center-of-gravity calculation section 20 and its center-of-gravity location are inputted into the image amplification processing section 22 next, and amplification processing of the image of the abnormal occurrence range is carried out by this image amplification processing section 22. In this amplification processing, it is expanded on the basis of the center-of-gravity location of the abnormal occurrence range so that the abnormal occurrence range may be settled in the display field angle of a monitor. In addition, the image data of the present image outputted from above-mentioned A/D converter 12 is used for the image data of the radical which carries out amplification processing. Moreover, as shown in this drawing, the smoothing processing section 21 is formed, and you may make it prevent that process so that it may reduce, and an image frame serves as migration, amplification / image that is hard to see by rapid change of an image frame smoothly.

[0015] After the image data of the abnormal occurrence range expanded as mentioned above is changed into an analog signal by D/A converter 24, it is inputted into a display 26. A display 26 outputs the picture signal of the present image by which the direct input was carried out as mentioned above from the surveillance camera 10, and the picture signal of the amplification image of the

abnormal occurrence range inputted from above-mentioned D/A converter 24 to a respectively different monitor, and displays simultaneously the present image and the amplification image of the abnormal occurrence range on a monitor.

[0016] Drawing 2 is drawing having shown a situation which showed a monitor table in a display 26 about the present image (the whole monitoring station image) and the amplification image of the abnormal occurrence range. The whole monitoring station image of monitor visual field frame 50 within the limits currently photoed with the surveillance camera 10 as shown in drawing 2 (A) is displayed on the monitor 1 shown in drawing 2 (B) as it is. On the other hand, amplification processing is carried out as mentioned above, and the image of the abnormal occurrence range 52 observed in the whole monitoring station image is displayed on a monitor 2. Moreover, when the suspicious person leading to an abnormal occurrence etc. moves by the monitor field within a station, in order to follow this and to also move the location of the abnormal occurrence range 52, amplification images, such as a suspicious person, project on a monitor 2 always. In addition, you may make it express the abnormal occurrence range 52 as a white frame etc. on a monitor 1.

[0017] Thus, while being able to grasp easily whether abnormalities have occurred in which location of a monitoring station by displaying simultaneously the whole monitoring station image and the amplification image of the abnormal

occurrence range on a monitor, the detail of the abnormal occurrence part can be easily checked by the amplification image. The whole monitoring station image and the amplification image of the abnormal occurrence range which were copied out on monitors 1 and 2 as mentioned above are recorded on one record medium by record means, such as VTR, in the image recording section 28 shown in drawing 1 . The whole monitoring station image and the amplification image of the abnormal occurrence range are recorded on a record medium as image data, at the time of playback of a record medium, reading appearance of these whole monitoring station image and the amplification image of the abnormal occurrence range which were recorded on the record medium is carried out, and both are displayed on a monitor.

[0018] In addition, only the whole monitoring station image may be recorded on the above-mentioned record medium as image data, and the information on the abnormal occurrence range and its center-of-gravity location may be recorded on it about the image of the abnormal occurrence range by the record approaches (for example, voice Records Department of a record medium etc.) with the another image itself. In this case, at the time of playback of a record medium, the enlarged display of a part of image data is extracted and carried out from the image data of the whole monitoring station image based on the information on the abnormal occurrence range and its center-of-gravity location.

[0019] Next, the gestalt of operation at the time of making it display these images on one monitor simultaneously rather than displaying the whole monitoring station image and the image of the abnormal occurrence range like the gestalt of the above-mentioned implementation using two monitors 1 and 2 is explained.

Drawing 2 (C) is drawing having shown a situation which showed a monitor table about the whole monitoring station image in this case, and the amplification image of the abnormal occurrence range. As shown in this drawing, the whole monitoring station image is displayed on the left half of a monitor 3, and the image of the abnormal occurrence range 52 is displayed on the right half of a monitor 3.

[0020] Thus, the surveillance camera system in the case of displaying the whole monitoring station image and the amplification image of the abnormal occurrence range on one monitor 3 is constituted like drawing 3. In addition, the same notation will be given [ the same as that of each block shown in above-mentioned drawing 1 among each block shown in drawing 3 or ] to the block of a similar operation, and the explanation is omitted. As shown in drawing 3, the image mixing processing section 30 is connected between the image amplification processing section 22 and D/A converter 24. While the image data of the amplification image of the abnormal occurrence range expanded by the above-mentioned image amplification processing section 22 is inputted, the

picture signal of the present image outputted from the surveillance camera 10 is inputted into this image mixing processing section 30 through A/D converter 12. And it is compounded by image data which is displayed 2 \*\*\*\*s on a monitor as the present image and the amplification image of the abnormal occurrence range showed to above-mentioned drawing 2 (C) by this image mixing processing section 30, and is outputted to a display 26 through D/A converter 24. Thereby, 2 \*\*\*\*s of the whole monitoring station image and the amplification images of the abnormal occurrence range are displayed on the monitor 3 of a display 26.

[0021] In addition, like the gestalt of the above-mentioned implementation, may divide the whole monitoring station image and the amplification image of the abnormal occurrence range, and they may not be displayed, but the amplification image (1/several about amplification image of the field angle of a monitor) of the abnormal occurrence range may be displayed in piles on the whole monitoring station image on the same monitor. You may fix to the corner of a monitor and the location which displays an amplification screen in piles may be displayed on the center-of-gravity location of the abnormal occurrence range. Composition of the image in this case can be performed in the image-processing section 30 of the surveillance camera system shown in drawing 3 .

[0022] As mentioned above, although the abnormal occurrence range is

detected automatically, the range is expanded in the image amplification processing section 22 and it was made to carry out an enlarged display to a monitor with the gestalt of the above-mentioned implementation, a monitor chooses the amplification range of an image intentionally, and may enable it to operate it not only in this but in the image amplification processing section 22. In this case, in case the image displayed on the monitor is recorded on a record medium, only the whole monitoring station image is recorded as image data, and it enables him for a monitor to choose the amplification range intentionally and to operate it also at the time of record and playback, by recording the location and magnitude which carry out an enlarged display by the record approach with the another image itself.

[0023] Moreover, although the gestalt of the above-mentioned implementation explained the case where this invention was applied to a surveillance camera system, this invention is applicable to the camera system of other arbitration of expanding the part which change generated not only in this but in the predetermined camera station, and displaying on a screen. Moreover, when reproducing the image recorded by the alien system by this system, it also becomes possible to carry out the enlarged display of the image of arbitration by actuation.

[0024]



[Effect of the Invention] Since both the whole photography location and the expanded change generating part can carry out image observation on a monitor according to the camera system concerning this invention as explained above, specification of a change generating part becomes easy.

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## DESCRIPTION OF DRAWINGS

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### [Brief Description of the Drawings]

[Drawing 1] Drawing 1 is the block diagram showing the gestalt of operation of the surveillance camera system concerning this invention.

[Drawing 2] Drawing 2 (A) thru/or (C) are the explanatory views having shown a situation which showed a monitor table about the whole monitoring station image and the amplification image of the abnormal occurrence range.

[Drawing 3] Drawing 3 is the block diagram showing the gestalt of other operations of the surveillance camera system concerning this invention.

### [Description of Notations]

1, 2, 3 -- Monitor

10 -- Surveillance camera

12 -- A/D converter

14 -- Image memory

16 -- Subtractor

18 -- Image difference distinction section

20 -- Center-of-gravity calculation section

22 -- Image amplification processing section

24 -- D/A converter

26 -- Display

28 -- Image recording section

30 -- Image mixing processing section